hospital. This aptly illustrates the importance of careful history notes even in cases of severe emergencies.

The clinical picture of ruptured ulcer is usually, as he has shown, fairly diagnostic. There are cases, however, which simulate other acute conditions. At autopsy in these cases, it is not uncommon to find that death was caused by peritonitis from ruptured peptic ulcer and that the secondarily inflamed appendix had been removed because it was thought to be the origin of the peritonitis. It behooves the surgeon, therefore, to make an incision which provides adequate exposure and which can be enlarged easily. In my opinion, small, muscle-splitting incisions should never be used in the so-called "acute abdomen."

Doctor Thompson states that almost 24 per cent of this series did not give a previous history of ulcer. In my own series, I believe this per cent is much higher. It is apparently the acute, fulminating ulcer that perforates.

Another condition which occasionally gives the same typical picture Doctor Thompson described, and which should be kept in mind, is an atypical case of coronary thrombosis. It is a patient of this type who will sometimes die on the operating table before or during the operation.

Statistical studies of this type, especially in the larger institutions, should be encouraged. The data are accurate, educational, and of great aid in the proper diagnosis of future cases.

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EDMUND BUTLER, M. D. (490 Post Street, San Francisco).—Doctor Thompson has presented a carefully prepared paper and has accurately evaluated the symptoms. The percentages given, I feel, will hold in any series of cases where peptic ulcer has the general characteristics, as is found in this part of the world. The extensive indurated type of peptic ulcer frequently occurring in Central Europe may give different symptom percentages.

Those of us who are more or less familiar with the intra-abdominal catastrophies hope always to keep mindful of the bizarre picture resulting from a perforation of a chronic peptic ulcer when many adhesions are present. The typical picture of perforated peptic ulcer seldom fails to create anxiety on the part of all concerned. There is often a feeling of well-being by the patient, with beginning septic peritonitis, occurring four to six hours after perforation. This period is marked by the greatest dilution of escaped gastric contents by a profuse peritoneal exudation. This apparent improvement is often misleading to the physician.

Some arrangement should be made for giving a greater number of doctors and medical students the opportunity to observe and examine acutely ill patients of this type. So often these patients enter the county hospital late at night, and only the interne and the resident on the service are privileged to examine and diagnosticate.

I have often stressed the taking of an upright film in all patients presenting an intra-abdominal catastrophy. Not infrequently free air is discovered, and leads to a diagnosis of a perforated ulcer where, up to that time, an ulcer had not been suspected. Free air is present in a variable number of cases, possibly 65 per cent, but is a positive finding, and precludes watchful waiting and prolonged discussion.

❦

E. ERIC LARSON, M. D. (1930 Wilshire Boulevard, Los Angeles).—The essayist has done a large amount of work in gathering statistics relative to the more accurate diagnosis of acute perforation of peptic ulcer, a complication that, without question, demands immediate and accurate diagnosis and no delay in surgical interference.

The primary diagnostic features are those of sudden severe pain, with an unmistakable rigidity of the abdominal muscles; and in 76 per cent of cases an antecedent history of peptic ulcer, as shown by Doctor Thompson. There are several intra-abdominal catastrophes to which these cardinal symptoms are prominently attached. Some instances of ruptured appendicitis and the bite of the Latrodectus mactans spider, as well as acute perforation of the gall-bladder with choleperitoneum, must be differentiated from this condition.

Doctor Thompson has compiled statistics relative to the confirmatory diagnostic features, which, if rigidly studied and studiously applied, eliminates the factor of error in the diagnosis in a very high percentage of cases. The leukocytosis, which in 84.3 per cent of cases, as Doctor Thompson's statistics show is high, and the referred pain spoken of in the essay with the x-ray evidence of intraperitoneal air bubble, should all assist in making a proper diagnosis.

❦

DOCTOR THOMPSON (Closing).—In the light of their clinical experience, the observations made by the discussers of this paper emphasize the practical value of certain statistical findings of this report. As is well known, a matter of frequent comment among surgeons who deal with these cases is that a considerable number of acute perforations occur in patients who do not give a history of previous ulcer symptoms. Prior to making this study, my own impression, to the effect that this situation obtained in more than 24 per cent of cases, was in agreement with that expressed by Doctor Morrison. It is very illuminating, therefore, to ascertain from this study that a history not merely of dyspepsia, but of dyspepsia possessing the location, relation to meals, periodicity, and relievability, which is characteristic of peptic ulcer, was obtained in so large a number as 76 per cent of cases.

Doctor Butler's remark regarding the value of intraperitoneal air in diagnosis also is well taken. I regret that this valuable diagnostic sign was not utilized in more than thirty-five cases in this study. However, it is significant that it was positive in 43 per cent of the cases in which it was used. Doctor Morrison's mention of coronary thrombosis and Doctor Larson's reminder that perforative appendicitis, poisoning from the bite of the black widow spider, and perforation of the gall-bladder with choleperitoneum should not be overlooked in differential diagnosis, are all valuable additions to this paper.

THE TRAUMATIC STATE*

By EDMUND BUTLER, M.D.
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DISCUSSION *by Alanson Weeks, M.D., and G. D. Delprat, M.D., San Francisco; H. S. Chapman, M.D., Stockton.*

DURING the last fiscal year, 67,048 patients were treated in the San Francisco Emergency Hospitals, 47,376 of these being surgical. Of the entire group, 13.7 per cent were classified as having extensive and severe injuries. The complete diagnosis in cases of multiple injuries is very difficult. The injury that for a time does not give recognizable symptoms, or in which symptoms may have been overshadowed by the more remarkable symptoms of the other injuries, may cause the patient's death. Because of the multiplicity of injuries, it becomes necessary for traumatic surgeons to know something about head injuries, thoracic injuries, abdominal injuries, and injuries of the extremities.

TRAFFIC ACCIDENTS

A recent English survey of automobile accidents showed that there were twice as many accidents in the cities as occurred in the country, but that there were twice as many deaths in the country as occurred in the city. This was attributed to the speed of the automobiles at the time of the accident. In 1934 there were over 36,000 deaths from traffic accidents in the United States. It is my opinion that many lives may be prolonged by judicious surgery performed by intelligent courageous surgeons.

Extradural Hemorrhage.—Le Conte reported five hundred autopsies following deaths from head

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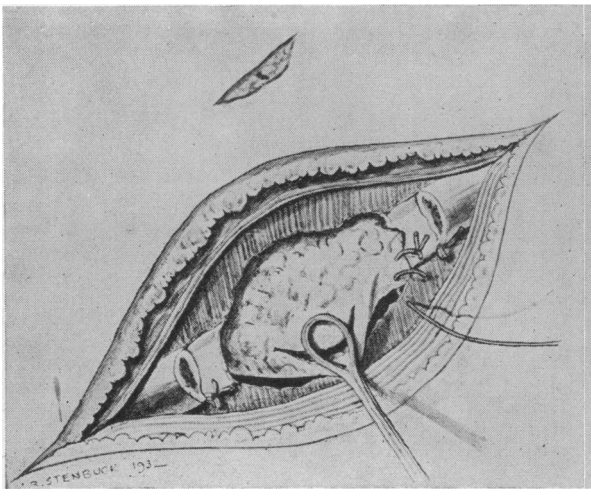

Fig. 1

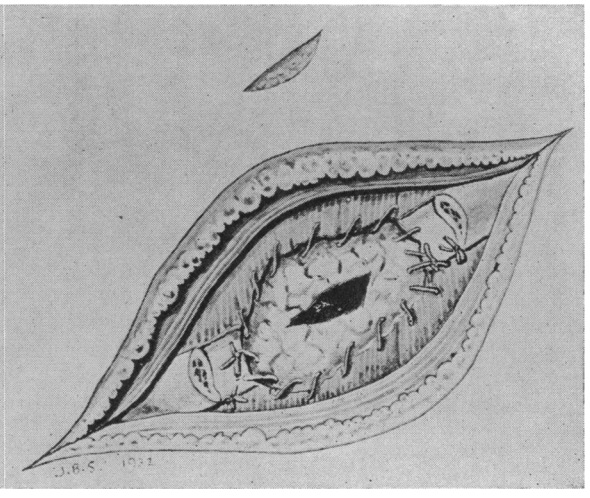

Fig. 2

Fig. 1.—Injured lung pulled into thorocotomy opening. Beginning of suture approximating parietal pleura and visceral pleura.
Fig. 2.—Completion of suture, no sucking of air; injured lung in position for efficient drainage.

injuries, and of these 50 per cent had sufficient extradural hemorrhage to be a factor in their deaths. Extradural hemorrhage is one of the conditions which is amenable to operative intervention. Every traumatic surgeon should be able and equipped to elevate depressed fractures, control hemorrhage, and remove a clot resulting from middle meningeal hemorrhage. The x-ray will locate the fracture, and the symptoms of increasing unilateral pressure should indicate early exploration.

Jaw Injuries.—Occasionally, crushing injury of the lower jaw and larynx call for immediate action. Intubation with the catheter airway, or tracheotomy are the procedures that will prolong life. Every emergency grip should contain one of these airways (or life-savers), and a tracheotomy set.

Chest.—There are certain injuries of the chest that may prove rapidly fatal, which occur more often than is generally believed. First and the most insidious is the closed pneumothorax resulting from rupture of the lung. The air escapes into the pleural space, causing positive pressure and later mediastinal shift, and finally collapse of the uninjured lung. A valve-like wound of the chest, allowing air to enter but not to escape, may also prove rapidly fatal. Both conditions call for release of the air from the pleural space.

If the collapse of the chest is due to the loss of bony support, as happens when the sternum is completely separated from the ribs or when a large section of the chest wall is loose, external fixation is required. If the sternum is at fault it may be fixed by grasping the sternum with towel clips and attaching to a frame over the chest. If a section of the rib cage is loose it may be fixed by passing wire, silk, or silk gut sutures, so as to include part of the rib and tie to a curved metal frame over the chest.

Lung Collapse.—The collapse of the lung, due to intrapleural hemorrhage, may call for early aspiration and control of the hemorrhage from the intracostal or internal mammary vessels, or from the vessels of the lung. The embarrassment that results from rupture of the diaphragm and the entrance of the abdominal viscera into the left pleural space will become adjusted if the other injuries are not too extensive.

Stab and Gunshot Wounds.—Stab wounds and gunshot wounds of the chest causing hemorrhage or sucking wounds call for exploration, control of hemorrhage, and exteriorization of the injured lung, as described by Conners and Stenbuck. (Figs. 1 and 2.)

Rupture of the Hollow Abdominal Viscera.—Rupture of the hollow abdominal viscera is very difficult of early diagnosis, particularly if the patient is alcoholic or in deep shock. The higher the rupture in the intestinal tract the easier the diagnosis, as stomach and upper bowel content are very irritating and cause a great amount of pain. Lower ileum and colon contents are less irritating but far more dangerous because of the virulent bacteria flora. The one extraperitoneal injury of hollow viscera that we must be continually suspecting is a retroperitoneal tear of the duodenum, most often produced by striking the steering wheel or steering post during an automobile collision. This injury gives symptoms similar to those of pancreatitis, sometimes with severe pain in the testicles. Later in the course of the injury retroperitoneal emphysema may be palpable by rectum.

One rather unusual rupture of the hollow viscera following crushing injuries of the abdomen (the crushing may be in the upper abdomen) is a tear in the anterior wall of the rectum, which must be the result of explosive forces due to compression of the gases in the lower colon. This was found in two patients during the last two years; in one it was found during autopsy, and in the other it accompanied a rupture of the small bowel and was sutured, resulting in recovery.

Rupture of the Urinary Bladder.—Rupture of the urinary bladder is much more frequent than a great many people are willing to believe. Rupture of the urinary bladder may cause few symptoms,

and in the presence of multiple soft tissue injury or bone injury, is so easily overlooked. It is an order in the San Francisco Emergency Service that every deeply alcoholic or shock patient coming into the hospital shall be catheterized as soon as possible. In the emergency service there have been more than twenty ruptures of the bladder operated upon during the last five years, and I feel that possibly many more have slipped by and have been a factor in death of the individual. Less than 5 per cent of the ruptures of the bladder are due to fractures of the pelvis, and 40 per cent are due to automobile accidents. The remainder result from crushing injuries and falls, as is stated by Tarnowsky. It is not unusual to inject 300 cubic centimeters of saline solution and remove 700 cubic centimeters or more of fluid. In such cases the catheter sticks through the rupture in the bladder, and siphons out urine and saline which are free in the pelvis. Several patients have voided bloody urine when radiograms showed that the urine was free in the pelvis. The test I believe that should be used in all of these patients is this: if the urine contains blood, or no urine is removed by catheter, there should be injected 300 to 500 cubic centimeters of 5 per cent sodium iodid, and a radiogram made. This will show if the solution is confined to the bladder or soft parts (Fig. 3). Air also may be injected into the bladder and after a few moments this air may be found under the diaphragm if an intraperitoneal rupture of the bladder is present.

Rupture of the Liver, Spleen, and Kidney.—Rupture of the liver, of the spleen and of the kidney must always be suspected following an injury where great traumatizing force has been expended. A kidney injury may be slight, subcortical tears or contusions producing a few red cells in the urine. The increase of pain in the flank, and the persistence of bloody urine should suggest that an extensive laceration of the kidney may be present. Perirenal hemorrhage usually displaces the ascending or descending colon toward the midline. If the bleeding continues and the patient shows evidence of exsanguination, exploration of the kidney is imperative. Where it is difficult to rule out intra-abdominal injury, exploration through a transverse incision, beginning at the edge of the rectus and extending into the flank, is the incision of election. It is very easy to remove a kidney through this type of incision; the kidney is retracted toward the abdominal aorta tending to relax the pedicle, rather than away from it, as is usual in the posterior incision. Following the removal of one kidney, I have been rather reluctant to do a transfusion, anurea having occurred twice following transfusion.

The treatment of rupture of the liver, if it is possible to rule out rupture of the kidney or the spleen, is expectant. Bleeding from large lacerations may cease if the patient is allowed to remain in a state of low pressure and complete rest. Intravenous solutions, heart stimulants, and blood-pressure raising agents are contraindicated. If exsanguination is imminent, blood transfusion must be performed. If exploration is performed, bleeding from the liver may be controlled by compressing the hepatic artery and the portal vein in the gastrohepatic omentum between the index finger and the thumb, with the index finger in the foramen of Winslow. A springy gastro-intestinal clamp, the blades guarded by rubber tubing, may be used for compression of these vessels.

Fig. 3.—Catheter escaped through torn urethra into cellular tissue of scrotum. Shadow of 5 per cent sodium iodid in scrotum, none in the bladder or pelvis.

Unless the spleen is comminuted, hemorrhage is slow and often three or four days may pass before the symptoms are alarming. The leukocytosis, upper abdominal distress, pain in the supraclavicular regions, and the constant drop in hemoglobin should suggest intra-abdominal bleeding. Autotransfusion in rupture of the liver and spleen is life-saving, and when there is no contamination from gastro-intestinal contents, should be performed. A 1,000 cubic centimeter graduate, containing 100 cubic centimeters of two and one-half per cent sodium citrate, and a dipper, are all the equipment that is necessary for the collection of the blood.

Tears in the Mesenteric Vessels.—Tears in the mesenteric vessels are difficult of diagnosis; but the signs of intra-abdominal hemorrhage are present, and exploration should be indicated.

Lacerated Wounds in General.—Lacerated wounds, in general, must be considered potentially contaminated with aerobic and anaerobic bacteria. A thorough cleansing of the entire wound is important, together with enlargement of the skin wound if necessary, under local or general anesthesia. The tourniquet should be used until hemorrhage is controlled. The removal of all devitalized soft parts, and of all foreign material, is made easy by irrigation with weak peroxid solution. Use of antiseptics, after careful mechanical cleansing and irrigation, is of questionable value. Kock uses only sterile water and soap. Free use of iodin and many more modern antiseptics is advised by many writers; but too often the antiseptic solution is used freely without proper mechanical cleansing. If there is no crushing of soft

parts and all foreign material has been removed, and if the injuring instrument is reasonably clean, the wound may be closed; but only in case you are going to have complete supervision of the patient. Garlock states "the writer is convinced that just as soon as the general practice of suturing lacerated wounds without drainage and without regard for elementary tension of tissue is stopped, the general incidence of infection will rapidly decline. This statement applies solely to the practice of suturing without preliminary cleansing and debridement." All wounds should be explored by the sterile gloved finger. In this way it is possible to locate splinters and other foreign material in the depths of the wound.

A careful watch must be instituted to detect early anaerobic infection. The following are the symptoms as outlined by Tenopyr:

1. Pain out of all proportion to the severity of the injury coming on twelve to thirty-six hours after the injury.
2. Acuteness of intellect.
3. Dirty, greenish-gray membrane over the area of the wound.
4. Characteristic odor.
5. Bronzing of the skin.
6. Reddish tinge, serous discharge.
7. Gas bubbles shown by x-ray, four to six hours after infection starts.

Weinberg cites an experience of 191 cases treated by gas gangrene serum, with twenty-five deaths, giving a mortality of thirteen plus per cent. The mortality in cases treated without serum was about 75 per cent. A large series of wounds of like nature, not prophylactically treated with gas gangrene antitoxin, gave 7.2 per cent cases of gas gangrene, while only four cases of gangrene occurred in 319 cases treated prophylactically. It is surprising how many cases of gas infection have been reported in which recovery has occurred in spite of inadequate surgical treatment where the serum treatment was administered.

The treatment of gas gangrene infection:

Prophylactic treatment.

1. The proper mechanical cleansing of lacerated wounds, infected wounds being left open and irrigated with Dakin's solution.
2. In all extensive wounds at least one therapeutic dose of polyvalent antigas gangrene antitoxin should be given, as well as the antitetanic serum.

Active treatment.

1. Large doses of polyvalent serum intravenously.
2. Free drainage should be instituted, and if the infection is found to be isolated to one muscle, this muscle should be removed.
3. If many muscle groups are involved, it may be necessary for an amputation to be performed; but under no consideration must the stump be closed. It must be left wide open, with free drainage.

In conclusion, I desire to stress the great value of the radiogram as an aid in the early diagnosis of the injuries of severely traumatized individuals.

490 Post Street.

DISCUSSION

ALANSON WEEKS, M. D., AND G. D. DELPRAT, M. D. (384 Post Street, San Francisco).—Doctor Butler's paper could well be used as a textbook for the care of patients in the "traumatic state." His main thesis is the careful examination of the injured patient, both as to the immediate and obvious site of injury, and also as to the more remote areas that may increase in prominence and importance. This cannot be overemphasized. On the other hand, one of the first lessons a surgeon should learn in the care of the "traumatic state" is not to become panicky and overdo everything, which is so often the tendency; such as pumping fluid into one blood vessel while it leaks out of another, and operating before symptoms have developed sufficiently to guide the surgeon and make the operation justifiable. In other words, "give the patient a chance to do without you" in the well-marked limits shown in this paper.

Some of us still remember our experiences at the front in the last "war to end war," where gas-infection and gangrene were hideous realities in most of the wounded. We would suggest that the surgeon be alert for the following signs: lemon-yellow color of the skin; pulse elevated out of proportion to the temperature, and a characteristic mousey odor. Crepitation may be felt if the infection is in the superficial tissues, but cannot be felt if the gas is developing deep in a limb. These signs should make the diagnosis certain.

The improved mortality with use of serum shows brilliantly the advance of medical science in the last fifteen or twenty years. During the war, amputation well above the involved area was the only hope; although as the war ended, serum was just coming to be considered.

We have gone far also in the care of injuries to the brain. Some of us still remember the advice of one of our foremost brain surgeons, to open nearly all of these injuries; and we know now that only those with the specific indication of localized pressure or increasing hemorrhage should ever be so operated upon.

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H. S. CHAPMAN, M. D. (305 Medico-Dental Building, Stockton).—Doctor Butler covers the field so thoroughly that he leaves little for comment. Each of his subjects has been well considered, and important points brought out. We who are connected with emergency hospitals see more of these cases than does the average person; however, with the ever-increasing number of automobiles, and the ever-increasing number of accidents, it behooves every man to be well grounded in the subjects discussed by Doctor Butler.

THE RÔLE OF THE GENERAL PRACTITIONER IN PRESENT-DAY MEDICINE

By MAURICE B. BONTA, M.D.
Los Angeles

DISCUSSION *by A. B. Cooke, M. D., Los Angeles; John W. Shuman, M. D., Los Angeles; J. Marion Read, M. D., San Francisco.*

THERE are today many currents and cross-currents in the practice of medicine. Just as with the ebb and flow of the tide upon the ocean's ever-shifting sands promontories disappear and new islets arise, so today we are witnessing rapid changes in the science and art of medicine.

IS THIS THE DAY OF SPECIALIZATION?

In recent years there have been heard all too frequently voices of those crying: "This is the day of specialization. The general practitioner is disappearing from the scene of action."